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09/625,065	07/25/2000	Douglas G. Lockie	END 028	6800

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EXAMINER	
DEAN, RAYMOND S	
ART UNIT	**PAPER NUMBER**
2684	6

DATE MAILED: 11/10/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/625,065	LOCKIE ET AL.	
	Examiner	Art Unit	
	Raymond S Dean	2684	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) *1* is/are allowed.

6)☒ Claim(s) *1-9 and 12-24* is/are rejected.

7)☒ Claim(s) *10 - 11* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: Reference sign 35 for signal processing circuitry in Figs. 4 - 6. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 13 - 15 are rejected under 35 U. S. C. 102(e) as being anticipated by Tamil et al. (6,169,910 B1).

Regarding Claim 13, Tamil teaches a hub apparatus for a millimeter wave wireless communication system comprising: a support member (Column 1 lines 14 –21 tower as support structure, Column 11 lines 7 –14)

A hub-based transmit antenna coupled to said support member that propagates electromagnetic energy to a plurality of customer premises equipment (CPEs) within the range illuminated by said transmit antenna (Column 2 lines 66 –67, Column 3 lines 1 – 4, Column 3 lines 46 – 52, Column 4 lines 1 – 2, it is inherent in wireless point to multipoint design that the CPEs are in the range of the signals radiating from the transmit antenna)

A hub-based receive antenna mechanism coupled to said support member that receives a plurality of pencil beam transmissions from different CPEs located in different physical locations within the range of the transmit antenna, said receive antenna mechanism including a shared aperture antenna device (Column 2 lines 66 – 67, Column 3 lines 1 – 11, Column 3 lines 43 – 45, Column 3 lines 49 – 52, lens can be modified such that one can transmit and receive signals of different narrow beam widths which would encompass pencil beams, Column 6 lines 27 – 33, it is also inherent in the design of point to multipoint wireless communication systems that the CPEs are in the range of the radiation pattern of the transmit hub antenna).

Regarding Claim 14, Tamil further teaches said transmit antenna including a shared aperture antenna device (Column 3 lines 4 – 6, Column 3 lines 46 – 52).

Regarding Claim 15, Tamil teaches a shared aperture transmit antenna device and a shared aperture receive antenna device that utilize at least in part a common shared aperture device (Column 2 lines 65 – 67, Column 3 lines 1 – 27)

and a hub configuration that includes circuitry for processing separate receive and transmit signals from and to, respectively, that common shared aperture device (Fig 1, Fig 7, Column 3 lines 18 - 27, Column 6 lines 33 – 36).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1 – 9, 12, and 16 - 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tamil et al. (6,169,910 B1) in view of Brookner et al. (6,232,920 B1).

Regarding Claim 1, Tamil teaches a hub apparatus for a millimeter wave wireless communication system comprising a support member (Column 1 lines 14 – 21, tower as support structure, Column 11 lines 7 –14) and a receive antenna mechanism coupled to said support member that receives a plurality of pencil beam transmissions from different customer premises equipment (CPEs) located in different physical locations within the range of the radiation pattern of said fan antenna (Column 2 lines 66 – 67, Column 3 lines 1 – 11, Column 3 lines 43 – 45, Column 3 lines 49 – 52, lens can be modified such that one can transmit and receive signals of different narrow beam widths which would encompass pencil beams Column 6 lines 27 – 33, a lens antenna that can

change the direction of the beams Column 3 lines 7 – 10, it is also inherent in the design of point to multipoint wireless communication systems that the CPEs are in the range of the radiation pattern of the transmit hub antenna).

Tamil does not teach a fan beam antenna coupled to said support member that propagates electromagnetic energy in a fan pattern.

Brookner teaches a fan beam antenna that propagates electromagnetic energy in a fan pattern (multiple pencil beams or fan beams can be generated depending on the aperture, Column 1 lines 47 – 52, Column 4 lines 66 – 67, Column 5 lines 1 – 3, Column 7 lines 66 - 67, Column 8 lines 1 –4).

Tamil and Brookner both teach an antenna that is directionally agile and can transmit multiple beams therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to make a design preference and use the two dimensional phased array antenna with a rectangular aperture taught in Brookner in place of the lens antenna taught in Tamil in order to achieve an alternative means for transmitting multiple beams to multiple subscribers or CPEs in the wireless point to multipoint system disclosed in Tamil.

Regarding Claim 2, Tamil in view of Brookner teaches all of the claimed limitations recited in Claim 1. Brookner further teaches a fan beam antenna (Column 1 lines 47 – 52, Column 4 lines 66 – 67, Column 5 lines 1 - 3) propagating an electromagnetic radiation pattern that has an azimuth component that is greater than its elevation component (Brookner teaches a multibeam antenna array with the ability to steer and shape multiple beams in different azimuths and elevations therefore teaching

the ability to have an azimuth component greater than corresponding elevation component, Column 7 lines 23 – 32, Column 7 lines 44 – 54).

Regarding Claim 3, Tamil in view of Brookner teaches all of the claimed limitations recited in Claim 1. Brookner further teaches a fan beam antenna (Column 1 lines 47 – 52, Column 4 lines 66 – 67, Column 5 lines 1 -3) that propagates millimeter wave electromagnetic energy (Column 2 lines 16 – 50).

Regarding Claim 4, Tamil in view of Brookner teaches all of the claimed limitations recited in Claim 1. Tamil further teaches a receive antenna mechanism that includes a shared aperture antenna device (Column 3 lines 6 – 13).

Regarding Claim 8, Tamil in view of Brookner teaches all of the claimed limitations recited in Claim 1.

Tamil does not specifically teach a receive antenna mechanism that is an array of pencil beam receive antennas.

Brookner teaches a receive antenna mechanism that is an array of pencil beam receive antennas (Column 1 lines 47 – 52, Column 2 lines 53 – 67, Column 3 lines 1-2, Column 3 lines 23 –25, Column 7 lines 66 – 67, Column 8 lines 1 – 4).

Tamil and Brookner both teach an antenna that is directionally agile and can receive multiple pencil beams therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to make a design preference and use the array of pencil beam receive antennas taught by Brookner in place of the lens antenna in Tamil as an alternative means for receiving narrow or pencil beams.

Regarding Claim 9, Tamil in view of Brookner teaches all of the claimed limitations recited in Claim 1. Tamil further teaches at least one of said fan beam antenna and said receive antenna mechanism that is configured to function in 360 degrees in azimuth (Column 3 lines 7 – 10).

Regarding Claim 5, Tamil teaches all of the claimed limitations recited in Claim 4.

Tamil does not specifically teach a shared aperture antenna device that is a phased array antenna device.

Brookner teaches a shared aperture antenna that is a phased array antenna device (Column 1 lines 46 – 53, Column 2 lines 53 – 67, Column 4 lines 66 – 67, Column 5 lines 1 – 3).

Tamil and Brookner both teach an antenna that has a shared aperture and an antenna that is directionally agile therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to make a design preference and use the shared aperture phased array antenna taught in Brookner in place of the lens antenna in Tamil as an alternative means for receiving multiple beams.

Regarding Claim 6, Tamil teaches all of the claimed limitations recited in Claim 4.

Tamil does not specifically teach a shared aperture antenna device that is a multi-beam antenna device and has a plurality of individual feeds provided therewith, each feed propagating a pencil beam transmission from a different physical location.

Brookner teaches a shared aperture antenna device that is a multi-beam antenna device and has a plurality of individual feeds provided therewith, each feed propagating a pencil beam transmission from a different physical location (Column 1 lines 47 – 52,

Column 2 lines 53 – 67, Column 3 lines 1-2, Column 3 lines 23 –25, Column 7 lines 66 – 67, Column 8 lines 1 – 4).

Tamil and Brookner both teach an antenna with the following characteristics: shared aperture, directionally agile, and receives multiple pencil beams. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to make a design preference and use the shared aperture phased array antenna taught in Brookner in place of the lens antenna in Tamil as an alternative means for receiving multiple pencil beams.

Regarding Claim 7, Tamil teaches all of the claimed limitations recited in Claim 4. Tamil further teaches a shared aperture antenna device that includes a Luneberg lens (Column 6 lines 1 – 4).

Regarding Claim 12, Tamil teaches a hub apparatus for a millimeter wave wireless communication system comprising a support member (Column 1 lines 14 – 21, tower as support structure, Column 11 lines 7 –14) and a receive antenna mechanism coupled to said support member that receives a plurality of pencil beam transmissions from different customer premises equipment (CPEs) located in different physical locations within the range of the radiation pattern of said transmission antenna (Column 2 lines 66 – 67, Column 3 lines 1 – 11, Column 3 lines 43 – 45, Column 3 lines 49 – 52, lens can be modified such that one can transmit and receive signals of different narrow beam widths which would encompass pencil beams Column 6 lines 27 – 33, a lens antenna that can change the direction of the beams (Column 3 lines 7 – 10), it is also

inherent in the design of point to multipoint wireless communication systems that the CPEs are in the range of the radiation pattern of the transmit hub antenna).

Tamil does not specifically teach a transmission antenna coupled to said support member that propagates electromagnetic energy in a pattern that has an azimuth component that is larger than the elevation component but it does teach a directionally agile antenna (Column 3 lines 7 – 10).

Brookner teaches a transmission antenna that propagates electromagnetic energy in a pattern that has an azimuth component that is larger than the elevation component (Column 3 lines 23 – 25, Column 7 lines 23 – 32, Column 7 lines 44 – 54, Brookner teaches a multibeam antenna array with the ability to steer and shape multiple beams in different azimuths and elevations therefore teaching the ability to have an azimuth component greater than corresponding elevation component).

Tamil and Brookner both teach an antenna that is directionally agile, thereby having the ability to steer beams in various directions. Thus it would have been obvious to one of ordinary skill in the art to make a design preference and use the directionally agile antenna as taught by Brookner in place of the directionally agile lens antenna as taught by Tamil to obtain an alternative means of directional agility.

Regarding Claims 16, Tamil teaches all of the claimed limitations recited in Claim 14.

Tamil does not specifically teach a shared aperture transmit antenna device that includes a multi-beam antenna device.

Brookner teaches a shared aperture transmit antenna device that includes a phased array antenna device (Column 1 lines 46 – 53, Column 2 lines 53 – 67, Column 3 lines 23 – 25, Column 4 lines 66 – 67, Column 5 lines 1 – 3, Column 7 lines 66 – 67, Column 8 lines 1 - 4).

Tamil and Brookner both teach an antenna that is directionally agile and has a shared aperture thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to make a design preference and use the shared aperture phased array antenna taught in Brookner in place of the lens antenna in Tamil as an alternative means for transmitting multiple beams to multiple CPEs.

Regarding Claim 17, Tamil teaches all of the claimed limitations recited in Claim 14.

Tamil does not specifically teach a shared aperture transmit antenna device that includes a multi-beam antenna device.

Brookner teaches a shared aperture transmit antenna device that includes a multi-beam antenna device (Column 1 lines 46 – 53, Column 2 lines 53 – 67, Column 3 lines 1-2, Column 3 lines 23 –25, Column 7 lines 66 – 67, Column 8 lines 1 – 4).

Tamil and Brookner both teach an antenna that: has a shared aperture, is directionally agile, and can generate multiple beams thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to make a design preference and use multiple beam antenna taught in Brookner in place of the lens antenna in Tamil as an alternative means for transmitting multiple beams to multiple CPEs.

Regarding Claim 18, Tamil teaches all of the claimed limitations recited in Claim 13.

Tamil does not specifically teach a transmit antenna that includes a fan antenna device.

Brookner teaches a transmit antenna that includes a fan antenna device (Column 1 lines 47 – 52, Column 3 lines 23 –25, Column 4 lines 66 – 67, Column 5 lines 1 – 3, Column 7 lines 66 - 67, Column 8 lines 1 –4).

Tamil and Brookner both teach an antenna that is directionally agile, has a shared aperture, and has the ability to generate multiple beams therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to make a design preference and use the two dimensional phased array antenna with a rectangular aperture taught in Brookner in place of the lens antenna taught in Tamil in order to achieve an alternative means for transmitting multiple beams to multiple subscribers or CPEs in the wireless point to multipoint system disclosed in Tamil.

6. Claims 19 - 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Langston et al. (6,006,069 B1) in view of Myers et al. (6,304,762 B1).

Regarding Claim 19, Langston teaches a millimeter wave wireless communication system comprising: a support structure (Column 1 lines 9 – 11, Column 1 lines 59 – 67, Column 2 lines 1 – 3, there is an inherent antenna support structure because of the area that the propagation covers Column 2 lines 34 - 39)

A hub-based transmit antenna coupled to said support structure for transmitting electromagnetic energy (Column 1 lines 59 – 67).

A plurality of customer premises equipment (CPEs) capable of receiving electromagnetic radiation from said hub-based antenna (Column 1 lines 59 – 67, Column 2 lines 1 –3).

Langston does not teach each CPE including a pencil beam antenna for transmitting electromagnetic energy towards said hub support structure and a receive antenna mechanism coupled to said hub support structure that receives pencil beam electromagnetic energy from each of said plurality of CPEs.

Myers teaches a point to multipoint system where each CPE includes a pencil beam antenna for transmitting electromagnetic energy towards said hub antenna (Column 4 lines 39 – 44)

Myers also teaches a point to multipoint system where the receive antenna receives pencil beam electromagnetic energy from each of said plurality of CPEs (the antennas are configured such that they can receive pencil beams from the remote stations or CPEs Column 4 lines 30 – 38, Column 5 lines 44 – 61).

Langston and Myers both teach the same point to multipoint system except that Myers teaches a modification or improvement of said system (Column 2 lines 33 – 47). This improvement requires highly directional CPE antennas and a corresponding modification of the hub antenna for the reception of signals with high directionality. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system taught by Langston with the modifications

taught by Myers such that the hub antenna can receive upstream signals from shared frequencies between subscriber stations or CPEs in adjacent sectors without interference.

Regarding Claim 20, Langston in view of Myers teaches all of the claimed limitations recited in Claim 19.

Myers further teaches the pencil beam antenna of each CPE is used for transmit and receive (Column 4 lines 39 – 44).

Regarding Claim 21, Myers teaches all of the claimed limitations recited in Claim 20.

Myers further teaches said transmit antenna and said receive antenna mechanism are configured to propagate millimeter wave electromagnetic energy (the antennas at the hub are configured to transmit to and receive signals from the CPEs in the millimeter range Column 5 lines 36 - 61).

7. Claims 22 – 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Langston et al. (6,006,069 B1) in view of Myers et al. (6,304,762 B1) and in further view of Brookner et al. (6,232,920 B1).

Regarding Claim 22, Langston in view of Myers teaches all of the claimed limitations recited in Claim 19.

Langston in view of Myers does not specifically teach a receive antenna mechanism that includes a shared aperture antenna device.

Brookner teaches a receive antenna mechanism that includes a shared aperture antenna device (Column 1 lines 46 – 53, Column 3 lines 23 –25, Column 4 lines 66 – 67, Column 5 lines 1 – 3, Column 7 lines 66 – 67, Column 8 lines 1 -4).

Langston in view of Myers and Brookner teach an antenna that receives multiple pencil beams therefore it would be obvious to one of ordinary skill in the art at the time the invention was made to make a design preference and use the shared aperture antenna of Brookner in place of the nodal antenna of Langston in view of Myers as an alternative means of receiving multiple pencil beams from the CPEs with pencil beam antennas.

Regarding Claim 23, Langston in view of Myers teaches all of the claimed limitations recited in Claim 19.

Langston in view of Myers does not specifically teach a transmit antenna that includes a shared aperture antenna.

Brookner teaches a transmit antenna that includes a shared aperture antenna device (Column 1 lines 46 – 53, Column 3 lines 23 –25, Column 4 lines 66 – 67, Column 5 lines 1 – 3, Column 7 lines 66 – 67, Column 8 lines 1 -4).

Langston in view of Myers and Brookner teach an antenna that transmits multiple pencil beams therefore it would be obvious to one of ordinary skill in the art at the time the invention was made to make a design preference and use the shared aperture antenna of Brookner in place of the nodal antenna of Langston in view of Myers as an alternative means of transmitting multiple pencil beams to the CPEs with pencil beam antennas.

Regarding Claim 24, Langston in view of Myers teaches all of the claimed limitations recited in Claim 19.

Langston in view of Myers does not specifically teach a receive antenna mechanism that includes an array of pencil beam receive antennas.

Brookner teaches a receive antenna mechanism that includes an array of pencil beam receive antennas (Column 1 lines 46 – 53, Column 2 lines 53 – 67, Column 3 lines 23 –25, Column 7 lines 66 – 67, Column 8 lines 1 -4).

Langston in view of Myers and Brookner teach an antenna that receives multiple pencil beams therefore it would be obvious to one of ordinary skill in the art at the time the invention was made to make a design preference and use the shard aperture pencil beam array antenna of Brookner in place of the nodal antenna of Langston in view of Myers as an alternative means of receiving multiple pencil beams from the CPEs with pencil beam antennas.

Allowable Subject Matter

7. Claims 10 and 11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding Claim 10, there is prior art teaching a pencil beam or fan beam antenna in transmit mode as evidenced by Brookner, it is also well known in the art that a signal with a very high directionality like a pencil beam will have more signal strength than a fan beam signal that has less directionality but the prior art of record fails to show a pencil beam antenna that is capable of transmitting electromagnetic energy beyond the range of a fan beam antenna such that at a given distance from the hub the signal propagated from said pencil beam antenna has a greater signal strength than a signal propagated from said fan antenna.

Regarding Claim 11, there is prior art teaching a receive antenna mechanism that includes a receiver that processes the received signals as evidenced by Tamil (Column 6 lines 62 – 67, Column 7 lines 1 – 3) but the prior art of record fails to teach a multi-channel receiver that has multiple first mixers for separation of first IF signals, wherein each of said mixers is coupled to a common local oscillator signal generator.

Conclusion

1. Any inquiry concerning this communication should be directed to Raymond S. Dean at telephone number (703) 305-8998.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nay Maung, can be reached at (703) 308-7745. Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

Or faxed to:

(703) 872-9314 (for Technology center 2600 only)

Hand –delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist). Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

NAY MAUNG
SUPERVISORY PATENT EXAMINER